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研究会報告

YITP-W-06-04

ソフトマターの物理学 2006

— Beyond Self-Organization and Hierarchical Structures —

日時：2006年7月14日（金）－7月16日（日）

場所：〒606-8502 京都市左京区北白川追分町 京都大学基礎物理学研究所 湯川記念館

内容：

基礎物理学研究所主催の本研究集会は、ソフトマター関係の会議として5回目、国際研究集会として2回目の開催となる。従来の考え方では、ソフトマター物理学を「自己組織化過程と階層構造をもつ複雑系の物理学」と位置づけていたが、近年のソフトマターの研究分野の急速な拡大により、このような枠組みを越えた新しいパラダイムへの移行が必要とされている。本研究集会では、特に国内の若手研究者に対してソフトマター物理学の将来像を指し示し、実験と理論の連携・分野間の協力の重要性をアピールする場となることを目的とした。

3日間にわたる研究集会は、直前に開催された小角散乱実験に関する国際研究集会SAS2006とも連携することで、国内から140名（内外国人5名、大学院生54名）、海外から25名の総計165名の参加者を集め、盛会の内に終了した。研究会は、12名の招待講演者（内海外9名、国内3名）による各分野での実験・理論・計算機シミュレーションの最先端の研究発表と、12件の一般講演、そして81件のポスター発表が行われ、活発な議論がなされた。これらの幅広い分野の理論、実験、シミュレーションを専門にする方々の講演と討論を通じて、ソフトマター物理学の発展に大いに寄与できたと思う。また、本研究集会の目的とした新しいパラダイムを認識できたかについては、参加者各自の今後の研究の発展に待つべきところが大きい、「非平衡・複雑・両親媒性（生物）」などの研究が、ソフトマター物理学の次世代の研究のトレンドの一つとなるとの意見も示された。

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Program YITP-W-06-04

Friday, July 14th

13:30-13:40 Opening address : Toshihiro Kawakatsu (Tohoku Univ.)

Chair: J. Yamamoto (Kyoto Univ.)

13:40-14:20 Visible fingerprints of symmetry, topology and defects of lyotropic liquid crystals
P. Pieranski (Universite Paris-Sud, France)

14:20-15:00 Archimedean Tiling Phases from ABC Starpolymers:
The Road to Polymeric Quasicrystals
T. Dotera (Kyoto Univ.)

15:00-15:30 Structural studies of mesoporous crystals by electron microscopy
Y. Sakamoto (Stockholm Univ. Sweden)

15:30-15:50 --- Break (20min)---

Chair: P. Pieranski (Universite Paris-Sud)

15:50-16:30 Polymerization Induced Phase Transitions in Polymer Dispersed Liquid Crystals
and Polymer Photonic Crystals
T. Kyu (Akron Univ., USA)

16:30-17:00 Chemical Reaction at Specific Sites and Reaction-induced Self-assembly:
Enzymatic Polymerization of Cellulose
T. Hashimoto (Japan Atomic Energy Agency)

17:00-18:40 Poster Session 1 (Obligation time: 100min)

Saturday, July 15th

Chair: M. Doi (Univ. Tokyo)

9:00-9:40 Spontaneous Formation and Stability of Surfactant Vesicles
U. Olsson (Lund Univ., Sweden)

9:40-10:20 Deformation of vesicle and red blood cell in flow
H. Noguchi (Forschungszentrum Juelich, Germany)

10:20-10:50 Relation between the depletion interaction and the electrostatic interaction in
protein solutions

S. Tanaka (Hiroshima Univ.)

10:50-11:20 Probing and Analysis of the deformation of two-dimensional domain shape

M. Iwamoto (Tokyo Inst. Tech.)

--- Lunch ---

Chair: T. Taniguchi (Yamagata Univ.)

13:00-13:40 Molecular Picture of Dynamic Tube Dilation for Entangled Polymers

---Coarse-Graining of Length Scale Consistent with Time Scale ---

H. Watanabe (Kyoto Univ., Japan)

13:40-14:10 Change in Filler Network and Nonlinear Viscoelasticity of Filled Rubber

Y. Isono (Nagaoka Univ. Tech.)

14:10-14:40 Scattering function of a ring polymer with fixed knot: An exact expression in the condition and that of the correlation function

T. Deguchi (Ochanomizu Univ.)

14:50-16:30 Poster Session 2 (Obligation time: 100min)

Chair: S. Tanaka (Hiroshima Univ.)

16:30-17:10 Kinetic arrest and glass-glass transitions in short-ranged attractive colloids

T. Narayanan (ESRF, France)

17:10-17:40 The dielectric spectrum of the polyelectrolyte solutions

D. Lu (National Taiwan University)

17:40-18:10 Direct numerical simulations of electrophoresis of charged colloids: Smoothed profile method

K. Kim (Inst. Mol. Sci.)

18:30-20:00 Party (buffet-style) (Hokuto, CO-OP Campus Restaurant 2F, MAP)

Sunday, July 16th

Chair: M. Imai (Ochanomizu Univ.)

9:00-9:40 Kinetics of the water swelling of amphiphilic diblock copolymers
with adhesive properties

F. Nallet (Bordeaux Univ., France)

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- 9:40-10:10 Dot formation kinetics induced by Marangoni flow in the drying process of polymer solution drop
T. Yamaue (Univ. Tokyo)
- 10:10-10:40 Menger sponge-like fractal body created with a novel template method
H. Mayama (Hokkaido Univ.)
- 10:40-10:50 --- Break (10min)---
Chair: I. W. Hamley (Univ. Reading)
- 10:50-11:30 Towards a unified theory for entangled polymers: linear, branched and crosslinked
J. D. Schieber (Illinois Inst. Tech, USA)
- 11:30-12:00 Study on Multicomponent Systems by Means of Contrast Variation Small Angle Neutron Scattering
H. Endo (Univ. Tokyo)
- Lunch ---
Chair: J. Vinals (McGill Univ.)
- 13:30-14:10 Beyond hierarchical order in biomimetic and liquid crystalline block copolymers
I. W. Hamley (Univ. Reading, UK)
- 14:10-14:40 Reversible Deformation of Smectic Liquid-Crystalline Elastomers
K. Hiraoka (Tokyo Polytechnic Univ.)
- 14:40-14:50 --- Break (10min)---
Chair: T. Ohta (Kyoto Univ.)
- 14:50-15:30 Orientation selection in lamellar phases by oscillatory shears
J. Vinals (McGill Univ., Canada)
- 15:30-16:10 Non-linear rheology of lyotropic lamellar phases
S. Komura (Tokyo Metropolitan Univ.)
- 16:10-16:20 Closing address : Toshihiro Kawakatsu

Presentation List: Poster session 1

Friday, July 14th 17:00-18:40

1. Analytic theory of DNA toroids: from Van der Waals to Coulomb
Yukitaka Ishimoto (Okayama Inst. for Quantum Phys.)
2. Liquid-solid coexistence in mixed lipid membranes
Naofumi Shimokawa (Tokyo Metropolitan Univ.)
3. Simulation of DNA motion between two parallel planes with hydrodynamic interactions
Nobuhiko Watari (Univ. Tokyo)
4. Velocity correlation in the lipid-bilayer membrane at the equilibrium
Keiichiro Inaura (Keio Univ.)
5. Irreversible elastic responses of single collapsed DNA molecules
Yoshihiro Murayama (Univ. Tokyo)
6. Conformational Transition of Artificial Chromatins
Takahiro Sakaue (Kyoto Univ.)
7. Domains in membranes with active two-state inclusions
Chen Hsuan-Yi (National Central Univ. Taiwan)
8. Tracking Water Molecules on Protein Surfaces
Helmut Durchschlag (Univ. of Regensburg, Germany)
9. Withdrawn
10. Ionic conductivities of non-equivalent molten salts by molecular dynamics simulations
Shigeki Matsunaga (Nagaoka National college of tech.)
11. Variables of Dynamics in Supercooled liquids
Ayumi Minoguchi (Hokkaido Univ.)
12. Higher-order structure and Statistical Properties of Dipolar Nano-Particles
Akiyoshi Kuroda (Univ. Tokyo)
13. Resonant behavior of Ferrofluid with Oscillatory Shear Flow
Yuko Yamada (Nagoya Inst. Tech.)
14. Complex Rheology in a Simple Lattice Gas System
Akinori Awazu (Univ. Tokyo)
15. An order parameter equation for non-linear rheology of dense colloidal suspensions
Michio Otsuki (Univ. Tokyo)
16. The effect of detachment and attachment to a kink motion in the asymmetric simple exclusion process
Tetsuya Mitsudo (Kyoto Univ.)
17. The elasticity of nanoparticle networks on liquid droplets

- Chen Yong-Hsiang (National Central Univ. Taiwan)
18. Simulation study of the structure and dynamics of jungle-gym type gel
Masako Takasu (Kanazawa Univ.)
19. Elasticity of the electrode of CNT actuator and its effect on the deformation
Kousuke Nakamura (Univ. Tokyo)
20. Withdrawn
21. Structure and Dynamics in Polyacrylamide Hydrogels With and Without Probe Particles: A
Light Scattering Study
K. P. V. Sabareesh (Indira Gandhi Centre for Atomic Research, India.)
22. Deformation and buckling of polymer crusts formed by droplet evaporation
David Head (Univ. Tokyo)
23. Pattern formation at phase separation in the mixture of liquid crystals and polymers
Kousuke Kita (Kyushu Univ.)
24. Structure of large-angle Twist-Grain-Boundary of Chiral Liquid Crystals
Hiroto Ogawa (Tohoku Univ.)
25. Shear thinning behavior of lyotropic lamellar phase
Yoko Ishii (Tokyo Metropolitan Univ.)
26. Spontaneous Splay of Monolayers Comprised of Chiral Molecules at the Air-Water Interface
Due to the Electric Quadrupole Effect
Tetsuya Yamamoto (Tokyo Inst. Tech.)
27. Perturbative approach to the structure of a planar interface in the nematic liquid crystal
Robert Pelka (Univ. Tsukuba)
28. Micro-bubbles in liquid crystals
Camilla Voeltz (JST)
29. Adsorption of PEO-PPO-PEO Triblock Copolymer on Lipid Surface using Coarse Grained
Simulation
Masaomi Hatakeyama (Japan Advanced Inst. Sci. Tech.)
30. Buoyancy-driven Path Instabilities of an Air Bubble Rising in Water and Aqueous Polymer
Solutions of a Hele-Shaw Cell
Yoshihiro Ikeda (Mie Univ.)
31. Effects of Topological Constraint on the Relaxation of a Single Ring Polymer
Shinya Saka (Keio Univ.)
32. Multiply twinned particles on a silica mesoporous crystal
Keiichi Miyasaka (Stockholm Univ. Sweden)
33. Higher order structure of polymer spherulites
Hiroshi Kajioka (Kyoto Univ.)

34. Design of blockcopolymers for ordered microstructures
You Iida (Tohoku Univ.)
35. Shear Banding in Wormlike Micellar Solutions
Tatsuhiro Imaeda (Aichi Gakusen Univ.)
36. Critical Point Dewetting: the role of the gravity and the long-range force
Yoshinori Ohmasa (Kyoto Univ.)
37. Low-frequency Raman scattering for water-ethanol binary mixtures
Mari Sato (Univ. Tsukuba)
38. Spinoidal in liquid-solid phase separations
Akihiko Matsuyama (Kyushu Inst. Tech.)
39. Hydrodynamic Scaling and Its Breakdown in Randomly-Networked Liquids of Silica and Silicates
Yasushi Takeuchi (Tokyo Inst. Tech.)
40. Measurement of shear flow induced forces on helical screws
Chen Peilong (National Central Univ. Taiwan)
41. Spontaneous and guided selfassembly of clay nanoplatelets
Jon Otto Fossum (Norwegian Univ. of Sci. and Tech., Norway)

Presentation List: Poster session 2

Saturday, July 15th 14:50-16:30

1. Unbinding kinetics of multi-stacked phospholipid bilayers
Mafumi Hishida (Kyoto Univ.)
2. Conformational hysteresis of a giant DNA molecule
Yuji Higuchi (Kyoto Univ.)
3. A travelling wave surviving through an enviromental change
- Adaptation on an Excitable Field -
Masanobu Tanaka (Kyoto Univ.)
4. Growth Dynamics of Domains in Ternary Fluid Vesicles
Miho Yanagisawa (Ochanomizu Univ.)
5. Mechanical property of a giant liposome studied by laser tweezers
Yoko Shitamichi (Kyusyu Univ.)
6. Stretching a long DNA molecule by use of local heating
Masatoshi Ichikawa (Kyusyu Univ.)
7. Photo-induced transformation in a cell-sized lipid vesicle
Tsutomu Hamada (Japan Advanced Inst. Sci. Tech.)

8. Size and Viscoelasticity of Spatially Confined Multilamellar Vesicles
Shuji Fujii (Nagaoka Univ. Tech.)
9. Image analysis of conformational dynamics of DNA in concentrated solutions
Hiroki Sato (Tokyo Univ. Agri. Tech.)
10. Morphology transition of surfactant meso-structures induced by addition of colloidal particles
Yukiko Suganuma (Ochanomizu Univ.)
11. Velocity correlations in dense granular shear flows
Namiko Mitarai (Kyusyu Univ.)
12. A Gap between Liquid and Crystal of Hard Spheres
Tomonori Koda (Yamagata Univ.)
13. The limit of critical scaling in colloid-polymer mixtures
Paddy Royall (Univ. Tokyo)
14. Electrophoresis simulation of charged particles with thin double layer
Masato Makino (JST, Univ. Tokyo)
15. Interaction between colloidal spheres studied by optical tweezers
Yoshihiko Fujiwara (Kyusyu Univ.)
16. Withdrawn
17. Relationship between dynamic heterogeneity and medium-range crystalline order in a colloidal glass
Takeshi Kawasaki (Univ. Tokyo)
18. The effect of thermal fluctuation of impacts of nanoclusters
Hiroto Kuninaka (Chuo Univ.)
19. Control of crack formation by using memory of paste
Akio Nakahara (Nihon Univ.)
20. A simple model of skin formation in solvent evaporation processes
Tohru Okuzono (Univ. Tokyo)
21. Viscoelastic properties of thermoreversible gels formed by telechelic associating polymers
Tsutomu Indei (Kyoto Univ.)
22. Morphological selection in phase separation of a lyotropic liquid crystal
Yasutaka Iwashita (Univ. Tokyo)
23. Control of the phase separation pattern in a mixture of an isotropic liquid and liquid crystal
Takeaki Araki (Univ. Tokyo)
24. Formation of multiple ring-like wall in Nematic Liquid Crystal with focused laser beam
Masahiro Kojima (Kyoto Univ.)
25. Slow Shape-Recovery of Randomly Disordered Nematic Elastomers
Kenji Urayama (Kyoto Univ.)

26. On the numerical treatment of the dynamics of a conserved order parameter in the presence of impenetrable walls
Jun-ichi Fukuda (AIST)
27. Rheology of Bridged Wormlike Micelle
Kaori Nakaya (Ochanomizu Univ.)
28. Single chain distributions at the interface in micro phase separated structures obtained by self consistent field calculations
Hiroshi Morita (JST, Univ. Tokyo)
29. Long-range periodic structure induced by coupling of the solvation effect and concentration fluctuation in water and 3-methylpyridine with salts
Koichiro Sadakane (Kyoto Univ.)
30. The liquid-liquid transition and its order parameter
Rei Kurita (Univ. Tokyo)
31. Lattice Model of Sweeping Interface for Drying Process in Water-Granule Mixture
Hiizu Nakanishi (Kyusyu Univ.)
32. Orthorhombic Fddd Network in Diblock Copolymer Melts
Mikihito Takenaka (Kyoto Univ.)
33. Observation of a Low-viscosity Interface Between Immiscible Polymer Layers
Lal Jyotsana (Argonne National Laboratory, USA)
34. Confinement Effect on Surface Melting in Ultrathin Polymer Films
-Grazing-incidence x-ray scattering studies-
Tadanori Koga (Stony Brook Univ., USA)
35. Dynamic Density Functional Simulation of Micelle and Vesicle Formation Process in Amphiphilic Block Copolymer Solutions
Takashi Uneyama (Kyoto Univ.)
36. The morphological change in block copolymer thin films analyzed by SCF simulation
Hidekazu Sugimori (Kyoto Inst. Tech.)
37. Epitaxial Transition from Gyroid to Cylinder in a Diblock Copolymer Melt
Takashi Honda (JCII)
38. A slip-link model with 3D network structure
Kazushi Horio (Tokyo Univ. Agri. Tech.)
39. Visualization of Cavitation-induced Dynamic Fracture in Soft Adhesives
Tetsuo Yamaguchi (Univ. Tokyo)
40. Conformations of Single Semiflexible Chains in Poor Solvents: Density-of-States Monte Carlo Simulation
Shew Chwen-Yang (Kyoto Univ.)